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| 09/823,196      | 03/30/2001  | Thomas H. Baum       | 510                 | 1232             |

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INTELLECTUAL PROPERTY / TECHNOLOGY LAW  
PO BOX 14329  
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EXAMINER

KIELIN, ERIK J

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2813

2

DATE MAILED: 03/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/823,196

Applicant(s)

BAUM ET AL.

Examiner

Erik Kielin

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-- The MAILING DATE of this communication appears n th cover sh et with th corr spondenc address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-5,8-12,16,37 and 86 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,8-12,16,37 and 86 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 09 January 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This action responds to the Amendment and IDS (Paper No. 11) and the proposed drawing corrections (Paper No. 10), each filed 9 January 2003.

#### ***Drawings***

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 9 January 2003 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

### **INFORMATION ON HOW TO EFFECT DRAWING CHANGES**

#### **1. Correction of Informalities -- 37 CFR 1.85**

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

#### **2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.**

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

### Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-5, 8-12, 16, and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The newly added limitation to the claims that “at least two of x are different” is unclear, as there is only one x in the formula. It is well known in the art that the subscripted x is the number of parenthetical groups denoted in the chemical formula. Moreover, the specification makes clear, by repetitive recitations, that x matches the oxidation state of the metal. The metal can have only one oxidation state at a time. Accordingly, x cannot be two different numbers simultaneously.

Examiner believes that Applicant means that the metal complex has different amine ligands, such as the example of the Zr-metal complex given on page 8 of the Response (filed 9 January 2003, Paper No. 11). However, the recitation in the claim does not reflect this. A different formula would provide clarity, such as  $M(NR^1)_x(NR^2)_y$  wherein the sum of x and y is between 2 and 5 or, alternatively, equals the oxidation state of the metal. Because of the provided examples in the specification and original claims of the mixed ligand compounds, Examiner

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believes that there exists support for a general formula. (See, for example, original claim 6.)

However, based upon those same examples, Applicant does **not** have support for the general formula such as  $M(NR^1R^2)_x(NR^3R^4)_y$ , since no such general formula or example has been provided wherein each R group may be different. Accordingly, such formula would be beyond the scope of the specification and would generate new matter.

For the purposes of patentability, the claims will be interpreted as noted above, according to Applicant's Zr-metal complex example.

### *Claim Rejections - 35 USC § 102*

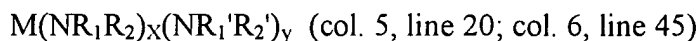
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 11, 12, and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,583,205 (**Rees, Jr.**).

Regarding claims 1 and 37, **Rees** discloses a CVD (chemical vapor deposition) precursor composition for forming a thin film dielectric on a substrate, including at least one metalloamide source reagent compound, or a vapor source reagent mixture including a metalloamide source reagent compound, having the formula



wherein M is a metal selected from Li, Zn, Y, La, lanthanide and actinide series elements (called the "F-series"), (Abstract; col. 6, lines 27-30; col. 7, Table 1); N is nitrogen; each of R<sup>1</sup>

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and  $R^2$  is the same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl,  $C_1$ - $C_8$  alkyl,  $C_1$ - $C_8$  perfluoroalkyl, alkylsilyl (col. 3, lines 24-43; col. 5, lines 1-28); and  $x+y$  is the oxidation state on metal M. (See also col. 6, lines 6-56.)

Regarding claims 2 and 3,  $R^1$  and  $R^2$  may be methyl or ethyl (col. 3, lines 24-43; col. 5, lines 1-28).

Regarding claims 11 and 12, the means by which the CVD precursor may be delivered to the CVD chamber is an intended method of using of the composition and does not have patentable weight in the instant claims drawn to composition. (See MPEP 2112.01 and 2112.02.)

### *Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 8-10, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Rees** in view of US 6,159,855 (**Vaartstra**).

Regarding claims 8-10, **Rees** does not indicate the solvents for the CVD precursor.

**Vaartstra** teaches a CVD precursor composition comprising metalloamides wherein the solvents in which the metalloamide precursor are dissolved to form the CVD precursor are disclosed at col. 8, lines 37-53. More specifically, ethers, amines, hydrocarbons (both aliphatic and aromatic) are disclosed. Further regarding claims 10, note that the  $C_5$ - $C_{10}$  aliphatic hydrocarbons are preferred and C8 is octane specifically.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use the solvents of **Vaartstra** as the solvents in the **Rees** CVD precursor composition, because **Vaartstra** teaches that metalloamides are soluble in such solvents for the purpose of CVD. Moreover, it has been held that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) (Claims to a printing ink comprising a solvent having the vapor pressure characteristics of butyl carbitol so that the ink would not dry at room temperature but would dry quickly upon heating were held invalid over a reference teaching a printing ink made with a different solvent that was nonvolatile at room temperature but highly volatile when heated in view of an article which taught the desired boiling point and vapor pressure characteristics of a solvent for printing inks and a catalog teaching the boiling point and vapor pressure characteristics of butyl carbitol. "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig - saw puzzle." (65 USPQ at 301).

Regarding claim 16, the prior art of **Rees**, as explained above, discloses each of the claimed features except for indicating multiple metalloamide source reagent compounds.

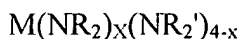
**Vaartstra** teaches a CVD precursor composition comprising multiple metalloamide source reagent compounds. (See paragraph bridging cols. 6-7.)

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use multiple metalloamides in a CVD precursor of **Rees** to achieve a deposited layer having both metals, as taught to be beneficial in **Vaartstra**.

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8. Claims 1, 4, 5, 37, and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article **Bradley and Thomas**, "Metallo-organic compounds containing metal-nitrogen bonds. Part I. Some dialkylamino-derivatives of titanium and zirconium" Journal of the Chemical Society, 1960, pp. 3857-3861 in view of either of **Rees** and **Vaartstra**.

**Bradley and Thomas** discloses a CVD (chemical vapor deposition) precursor composition for forming a thin film dielectric on a substrate, including at least one metalloamide source reagent compound, or a vapor source reagent mixture including a metalloamide source reagent compound, having the formula



wherein M is a metal selected from Zr and Ti; N is nitrogen; each of  $R_2$  and  $R'_2$  is the same or different and is independently selected from the group consisting of  $C_1$ - $C_8$  alkyl -- specifically ethyl, propyl, and butyl; and  $x+y$  is the oxidation state on metal M. (Abstract; Table 2 on p. 3860).

**Bradley and Thomas** does not teach that the compounds are used as CVD precursors.

As noted above, each of **Rees** and **Vaartstra** teach that metalloamides are useful as CVD precursors.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use the compounds of **Bradley and Thomas** as a CVD precursors, as taught in each of **Rees** and **Vaartstra**, because one of ordinary skill would recognize that they could be used for such purpose given their similarity to those compounds in each of **Rees** and **Vaartstra**.



*Response to Arguments*

9. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 703-306-5980. The examiner can normally be reached on 9:00 - 19:30 on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at 703-308-4940. The fax phone numbers for the

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organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Erik Kielin

March 22, 2003